



Littoral Combat and Power Projection Future Naval Capability (FNC) Expeditionary Logistics (ExLog) Thrust

**Presented at the
7th Annual NDIA Expeditionary Warfare
Conference**



Agenda



- Sea Basing Refresher
- ONR's Role in Naval Logistics
- ONR's Approach to Enabling Sea Basing
- Technology Transition
- Point of Contact



Advantages of Sea Basing



- Operate without host nation support
- Use the sea as maneuver space to enable implementation of STOM and EMW
- Increase the security of materials and personnel by keeping them mobile and over the horizon



Challenges to Sea Basing



- Logistics system reliability
 - Open ocean environment
 - Waves are larger as you get away from land
 - Current assets are not capable of efficient operation
 - Over the horizon operations
 - Sortie times are increased
 - Aircraft and lighter range capabilities are stretched
- Throughput capacity
 - Material movement to shore
 - Operational and logistics will compete for helicopters, MV-22s, and LCACs/lighters
 - Movement of materials from the Sea Base to lighters takes longer
 - Selective Offload
 - The time to get a specific item from the hold of the Sea Base to the debarkation point needs to be greatly improved
 - Workload required to perform selective offload must be dramatically reduced



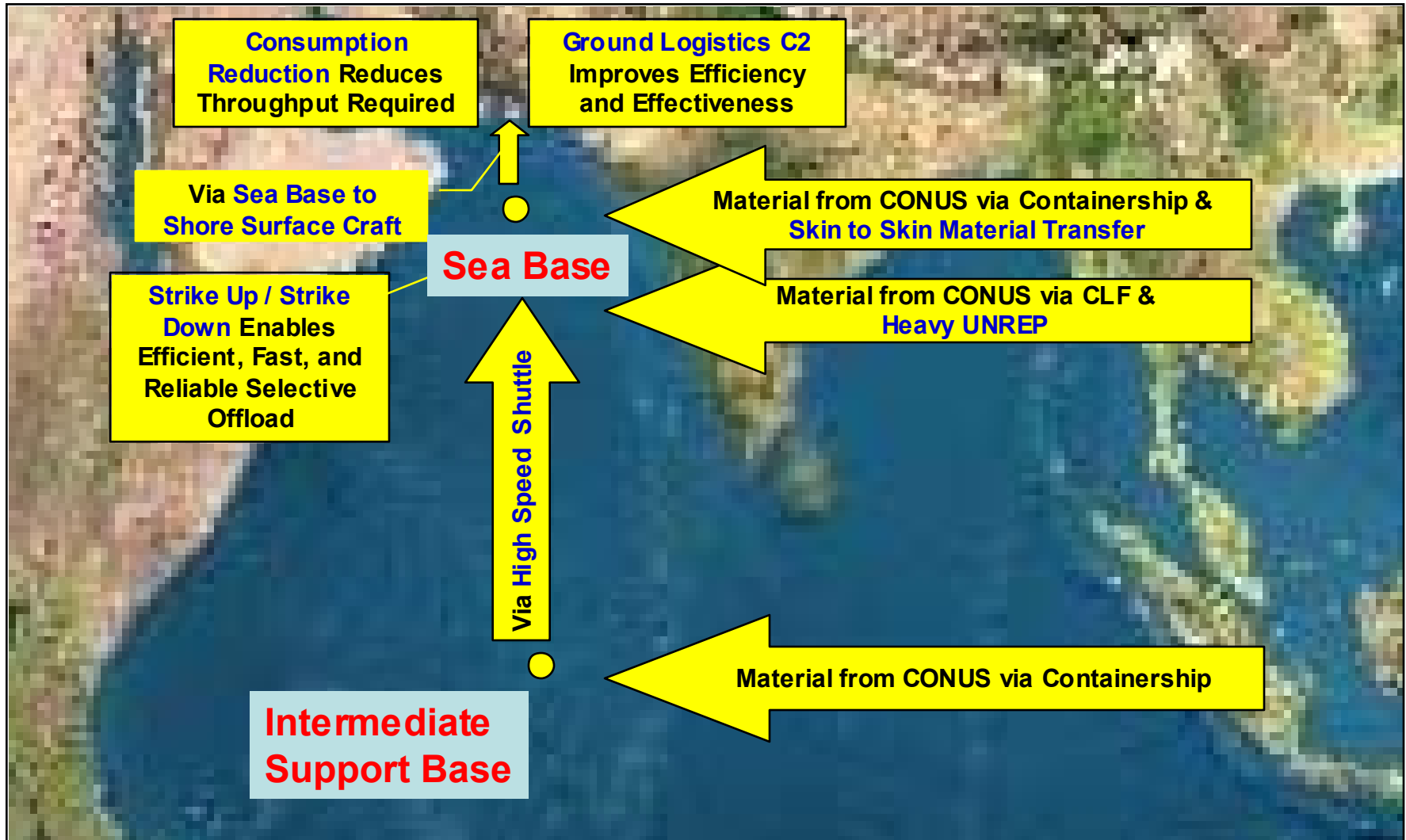
ONR's Role in Naval Logistics



- Identify and mature new technology that can be integrated into (or replace) current logistics systems or equipment
- Cannot develop “prototypes”, but must develop systems necessary to demonstrate the technology contextually
- ONR cannot perform engineering design development of the production system
- The investment focus is on the technology, not the system – if the demo system is too expensive, the value of the investment is diluted



System of Systems





M&S for Distribution EC



- Logistics material flow will be modeled from pierside at CONUS to vertical takeoff from Sea Base or roll off onto shore from a lighter
 - Quantify relative benefits of technologies
 - Provide a visualization of the material flow
 - Funding Navy Labs to gather and collect data to develop / validate the model
 - Data collection conducted on LHD 5 and T-AE 34 during weapons offload at NWS Earle
 - Data provided for other L-ships, T-AKE, and aircraft carriers



Enabling Sea Basing



Sea Basing

**Force
Closure**

**ATF
Interoperability**

Sustainment

**Reconstitution
Redeployment**

High Speed Shuttle

High Speed Shuttle

High Speed Shuttle

High Speed Shuttle

Heavy UNREP

Heavy UNREP

Heavy UNREP

Strike Up/Down

Strike Up/Down

Strike Up/Down

Ship to Shore
Surface Craft

Ship to Shore
Surface Craft

Ship to Shore
Surface Craft

Ship to Shore
Surface Craft

Skin to Skin
Material Transfer

Skin to Skin
Material Transfer

Skin to Skin
Material Transfer

Ground C2

Ground C2

Ground C2

Ground C2

Logistics M&S

Logistics M&S

Logistics M&S

Logistics M&S

Consumption
Reduction

Consumption
Reduction

Consumption
Reduction

Consumption
Reduction



Heavy UNREP



OBJECTIVE :

- Increase transfer rate (speed and/or payload) during connected replenishment to decrease UNREP time 50%
- Technology approach that can expand to sea state 5
- Extend ship separation distance
- Support manning objectives of future naval platforms

PAYOFF:

- Increase the throughput capacity of the system
- Reduce the time alongside (time away from primary mission)

TECHNICAL APPROACH:

- Multiple awards in multiple technology interest areas
- Tensioned ropeway / advanced materials
- Total load control / relative motion compensation / transfer motion control
- Unrep station-keeping / ship positioning

PERFORMERS:

- NSWC Port Hueneme, TBD

SCHEDULE:

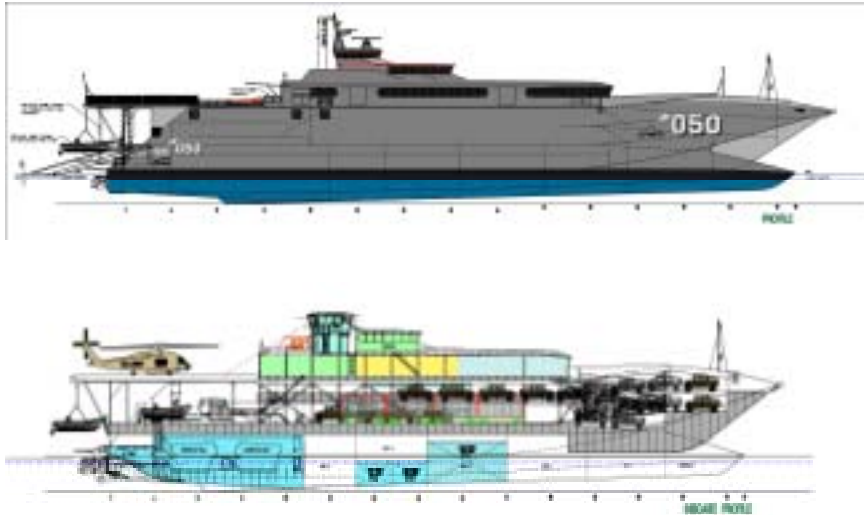
	FY02	FY03	FY04	FY05	FY06	FY07	FY08
Demo Model Development							
Technology Investigation							
Demo Model Procurement							
Demo Model ILS							
Test Site Development							
Land Based Tests							
Ship Installation Drawings							
Ship Installation							
In-Port Tests							
At-Sea Demonstrations							

TRANSITION TARGET:

- PEO EXW, backfit to T-AKE



High Speed Shuttle



OBJECTIVE :

- High speed sustainment of the seabase from the ISB
- Robust structures for reliable open ocean high speed operations
- Cargo transfer capability (RO/RO & LO/LO) in the open ocean environment
- Maximize crew and passenger performance

PAYOFF:

- Tailored, frequent sustainment (and retrograde disposal) to the seabase
- Reduced logistics footprint ashore
- Utility of intra-theater high speed vessels for reconstitution to the sea base

TECHNICAL APPROACH:

- FY02 *joint venture* experimentation
- Develop a technology roadmap to enable HSS (await MNS / ORD)
- Develop required technology starting in FY05

FY02 EXPERIMENTATION PERFORMERS:

ONR, NSWCCD, CSC, Navy Reserve

PERFORMERS:

- TBD for technical development

SCHEDULE:

TASKS	FY01	FY02	FY03	FY04	FY05	FY06	FY07
INSTRUMENT HSV	△						
DATA ANALYSIS		△	△				
MUA		△	△				
REQ DEV			△	△			
Tech Dev					△	△	△

TRANSITION TARGETS:

- PEO EXW



Skin to Skin Material Transfer



OBJECTIVE:

- Allow alongside, skin to skin material transfer in the open ocean environment
- Connect varied size ships and surface platforms with the need for only one of them to have Navy specific gear
- Ship to ship transfer of larger, heavier loads than possible using traditional CONREP approach
- Transfer the same amount of cargo in half the time as existing UNREP systems

PAYOFF:

- **Acts as a force multiplier by enabling non-self-unloading containerhips to provided sustainment rather than buying additional CLF ships for the job**

TECHNICAL APPROACH:

- Multiple low-level study awards in FY02, followed by competitively awarded FY03 development in feasible technology areas

Potential Products:

- Motion Compensating Cranes
- Inflatable Fendering, new fender materials
- Ship To Ship Securing
- Communications and stationkeeping aids

FY02 STUDY PERFORMERS: JJMA, NSWCCD

SCHEDULE:

TASKS	FY02	FY03	FY04	FY05	FY06	
BAA & Source Select	△					
Tech Feasibility Study	△—△					
BAA & Tech Dev		△—		△		
Tech Maturation				△—		△
Demo & Transition					△—△	

TRANSITION TARGETS:

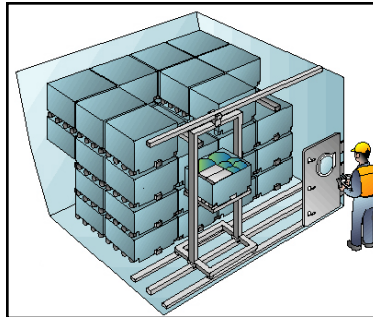
- MPF(F) / Sea Base Demonstration Ship
- Naval Operational Logistics IPT



Strike Up / Strike Down



Human Amplification Technology



Selective Offload Automation



Blast-Proof Packaging

TECHNICAL APPROACH:

- Awards in multiple technology interest areas made Spring 02.
- Initial Downselect early FY03.

TECHNOLOGY INTEREST AREAS:

- Load Movement and Handling
- Cargo Stowage
- Selected Offload

OBJECTIVE :

- Cargo strike up&down in sea state 5
- Cargo rates of 414 pallets/hr
- Workload reduction up to 75%
- Material available for issue within 4 hours
- Reductions in weight and power consumption

PAYOFF:

- **Potential Reduced Manning**
- **Increased Aircraft Sortie Rate**
- **Reduced Combat Ship Time Off-Station**

SCHEDULE:

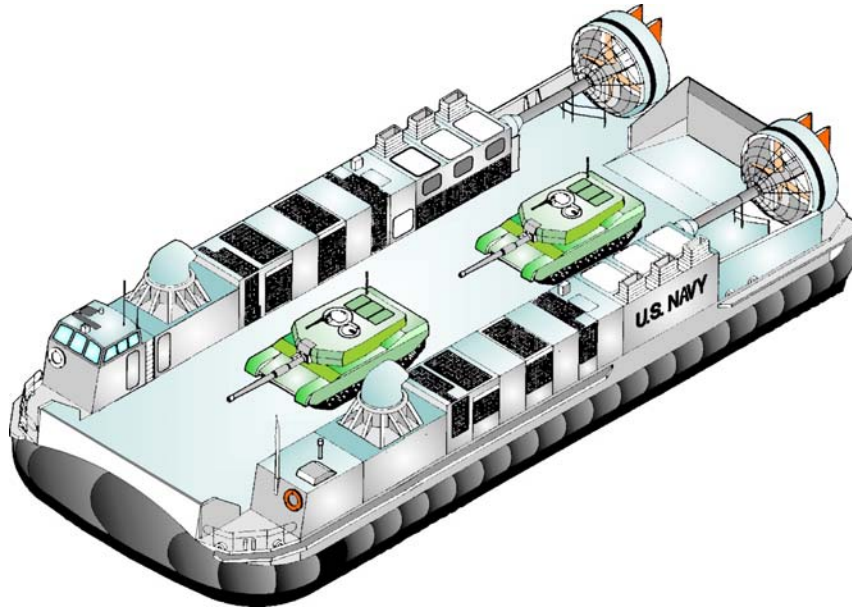
TASKS	FY01	FY02	FY03	FY04	FY05	FY06
BAA / Selection	△△					
Tech Development		△△				
IPR/ Downselect			△			
TRL Tech Matured			△	△		
Demo / Test				△	△	△

TRANSITION TARGETS:

- PEO EXW (LHA(R)/MPF(F))
- DDX
- PEO CARRIERS



Sea Base to Shore Surface Craft



OBJECTIVE:

- Develop technologies that enable current and planned lighterage systems to provide the best possible throughput and operational flexibility to support the sea basing concept
- Areas of focus include cargo transfer, cargo transport, system reliability/maintainability, and lighterage assembly

PAYOFF:

- Enable enhanced sea-borne positioning of assets, force reconstitution, and STOM through longer ranges, larger payloads, increased throughput rates, and increased safe operating envelopes
- Improve reliability to act as a force multiplier

APPROACH:

- Through a series of competitive contract awards, develop and transition technologies that improve the ability of current and planned lighterage vessels to support the sea base and the EMW doctrine

PRODUCTS:

- Propulsion Technology
- Advanced Hull Form Technology
- Cargo Transfer Technology
- Cargo Stabilization Technology
- Connector Technology

SCHEDULE:

ID	Task Name	01	2002	2003	2004	2005	2006	2007	2008
		H2	H1	H2	H1	H2	H1	H2	H1
1	SEABASE TO SHORE SURFACE CRAFT								
2	1.0 Transition/Project Mgmt								
173	2.0 SEABASE TO SHORE NEEDS DEFN								
202	3.0 TECHNOLOGY ROADMAP								
213	4.0 PROPULSION Technologies								
217	5.0 CARGO STABILIZATION Technologies								
221	6.0 CARGO TRANSFER Technologies								
225	7.0 ADV. HULLFORM Technologies								
229	8.0 Connector Technologies								

TRANSITION TARGETS:

- Heavy LCAC & LCAC SLEP
- NavOpLog IPT
- MPF(F)
- INLS



Consumption Reduction



- Investment begins in FY05
- Focus is on reducing the logistics throughput required by using resources more efficiently and reducing system weights
 - New lightweight construction materials
 - Ammo reduction
 - Power generation systems and alternative energy sources



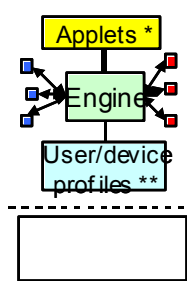
Comprehensive Logistics C2 System



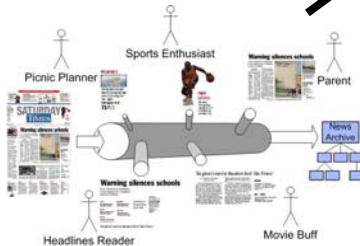
**Robust
Communication
Alternatives**



**Message
Prioritization &
Queuing**



**Information
Routing**



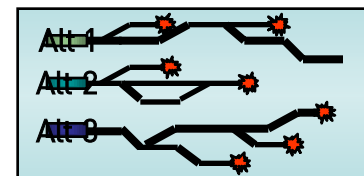
**Situational
Awareness &
Collaboration**



**Monitor Unit
Status &
Establish Alerts**



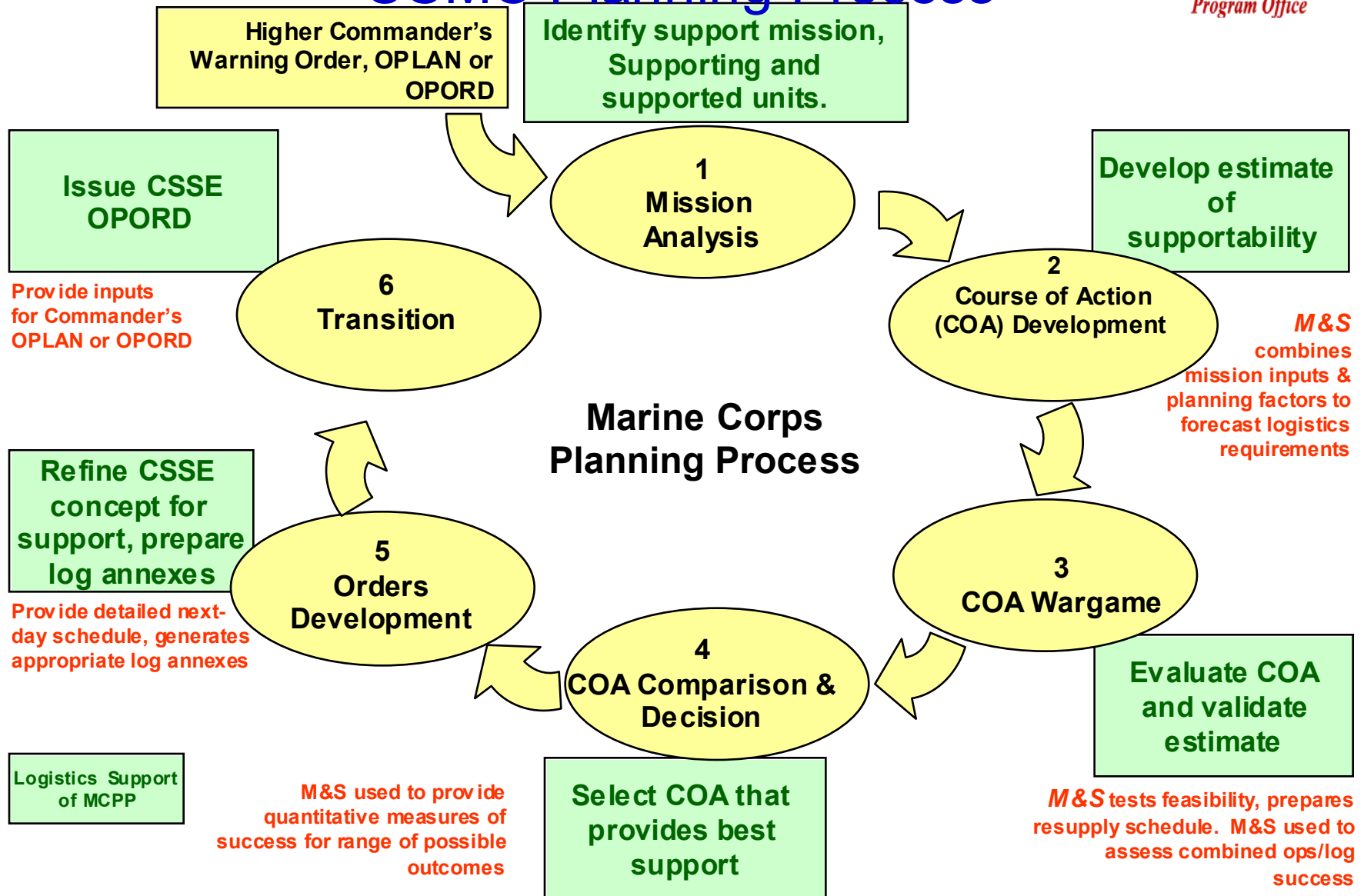
**Conduct COA
Analysis**



**Enable The
Logistician**

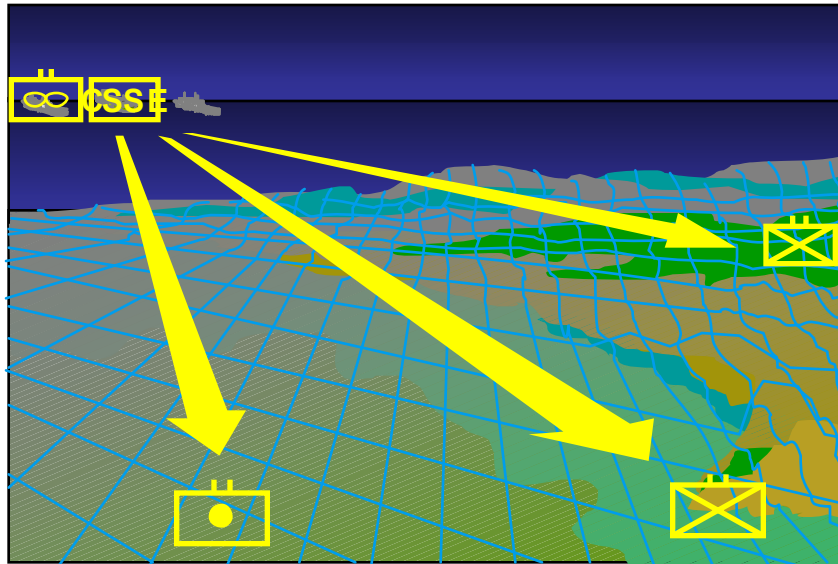


M&S Design to Support USMC Planning Process





Naval Command & Control



OBJECTIVE :

- Integrated logistics for the JTF/ATF/MAGTF
- Increased logistics (friendly) situational awareness
- Increased asset visibility
- Near real-time readiness monitoring of critically tracked items (CTI)
- Advanced decision support tools to increase afloat logistics efficiency and effectiveness

PAYOFF:

- Fully implement the Naval warfighting concepts
- Potential to reduce infrastructure ashore
- Potential to reconfigure afloat footprint
- Increased responsiveness

APPROACH:

- Employ maturing software capabilities to the logistics area, using incremental risk based prototyping
- Invest in operational logistics & decision support tools such as a Sustainment Calculator, Task Org Builder, COA Simulator, Risk Analysis, Event Matrices, Virtual Sand Table, Forecasting Models
- Approximately \$14M investment over 4 years

TECHNOLOGY INTEREST AREAS:

- Advanced scheduling/synchronization
- Non-linear solution / chaos theory

SCHEDULE:

TASKS	FY04	FY05	FY06	FY07
Program Planning and BAA	△△			
INITIAL TECHNOLOGY DEVELOPMENT		△△		
DOWNSELECT		△		
TECHNOLOGY MATURATION		△	△	
TECHNOLOGY INTEGRATION AND TRANSITION		△	△	△

TRANSITION TARGET: TBD



Technology Transition



- Prior to S&T investment
 - Conduct discussions with requirements, resource, acquisition, and fleet/force regarding capability gaps and operational issues
 - Establish commitments from all parties to take the technology / product from development to the fleet
 - Develop investment plan and execute S&T investment keeping everyone aware of the status and confirming direction is still correct
- The ExLog IPT has representation from all these communities and is responsible to ensure the investments are done in a reasonable manner



Business Opportunities



Expected BAA Release

Topic Area

- | | |
|--------------|---------------------------------------|
| • April 2003 | Fendering System Technology |
| • May 2003 | Tensioned Ropeway System Technology |
| • May 2003 | Total Load Control System Technology |
| • June 2003 | Ship Stationkeeping S/A Technology |
| • June 2003 | Propulsion Fan and Shroud Technology |
| • June 2003 | Lift Fan and Bow Thruster Technology |
| • June 2003 | 6-DOF Load Control Crane Technology |
| • Feb 2004 | Shipboard Asset Visibility Technology |
| • Feb 2004 | Mission Planning Support Technology |
| • Feb 2004 | Feedback Decision Support Technology |



ExLog POCs



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